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Renal Development - II (Poster Discussion) (South Banquet Hall)

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Renal protective effect of bone morphogenetic protein-2 in a rat model of ischemia-reperfusion injury.

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BMP-2 and BMP-7 are members of the TGFβ superfamily of growth and differentiation factors that are involved in development and tissue repair. The expression pattern of BMP-2 and BMP-7 frequently colocalize during embryonic development and both are expressed in kidney. In a previous report, BMP-7 administration protected the rat kidney from ischemia-reperfusion injury. Since BMP-2 and BMP-7 bind similar receptor subtypes, we explored whether BMP-2 treatment exhibits a similar protective effect.

Sprague-Dawley rats (n = 11 group) weighing 200-250 g received intravenous recombinant human BMP-2 (2.0 mg/Kg) or vehicle, at 0, 12, 24 and 48 h after a 40 min clamp of both renal arteries. Body weight, serum creatinine and hematocrit were measured before and 1, 2, 3 and 7 days after the clamp.

Body weight decreased about 15% in both groups during the first 3 days, with partial recovery by day 7. Hematocrit decreased by 15% in both groups. There was no significant difference in body weight or hematocrit at any time point between the two groups.

BMP-2 administration partially protected the renal function from ischemia-reperfusion injury. At day 1, the peak mean serum creatinine (mg/dl) was significantly lower in the BMP-2 treated group 3.04 ± 0.35 in comparison to the control group 4.37 ± 0.38 ($p < 0.02$). In addition, by day 2, 44% of the vehicle treated rats died, whereas only 11% died in the BMP-2 treated group. In the surviving animals, serum creatinine was lower on days 2, 3 and 7 in the BMP-2 treated group, although not significantly. The overall treatment effect evaluated by two way ANOVA analysis confirmed this trend ($p = 0.065$).

Thus, BMP-2 partially protected against renal ischemia-reperfusion injury and could potentially play a role in renal tissue repair.

Kidney regeneration
Bone morphogenetic proteins
Hypertension
Developmental biology and kidney regeneration
Bone and mineral physiology
Hypertension and circulatory disorders